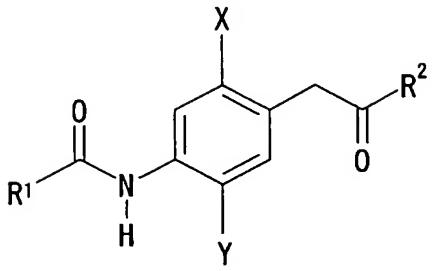
Claims

1. A process for producing a compound represented by formula (III):

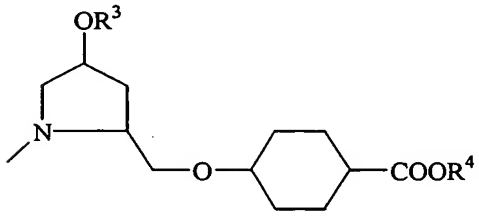
[F4]



(III)

(wherein R^1 represents an aryl group which may be substituted, or a heteroaryl group which may be substituted; R^2 represents a linear or branched lower alkoxy group which may be substituted, an aralkyloxy group which may be substituted, a phenoxy group, or a group represented by formula (a):

[F3]

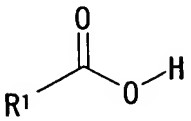


(a)

(wherein R^3 represents a linear or branched lower alkyl group which may be substituted; and R^4 represents a linear or branched lower alkyl group which may be substituted, or an aralkyl group which may be substituted); X represents a hydrogen atom or a halogen atom; and Y represents a halogen

atom or a lower alkoxy group), characterized by comprising reacting a compound represented by formula (I):

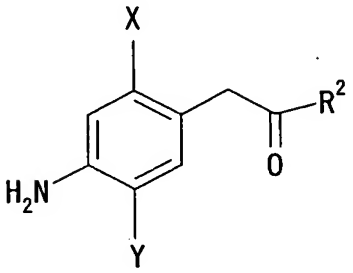
[F1]



(I)

(wherein R^1 has the same meaning as defined above) with a chlorinating agent and a compound represented by formula (II):

[F2]



(II)

(wherein R^2 has the same meaning as defined above) or a salt thereof under acidic conditions without addition of a base.

2. The process according to claim 1, wherein R^1 represents a 1-methylindolyl group.

3. The process according to claim 1 or 2, wherein the chlorinating agent is oxalyl chloride or thionyl chloride.

4. The process according to any one of claims 1 to 3, wherein R^2 represents a linear or branched lower alkoxy group.

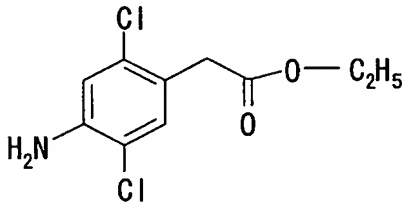
5. The process according to any one of claims 1 to 3, wherein R^2 represents a group represented by formula (a) wherein R^3 represents a methyl group, and R^4 represents a linear or branched lower alkyl group.

6. The process according to any one of claims 1 to 5, wherein X represents a chlorine atom or fluorine atom.

7. The process according to any one of claims 1 to 6, wherein X represents a chlorine atom, Y represents a chlorine atom, and R^1 represents a 1-methylindolyl group.

8. A hydrochloric acid salt of a compound represented by formula (IV).

[F5]

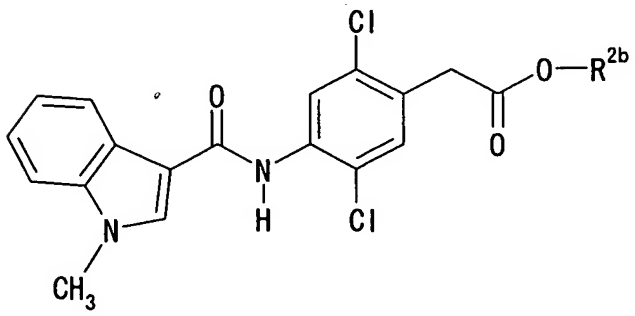


(IV)

9. The process according to any one of claims 1 to 7, wherein the compound represented by formula (II) or a salt thereof is a hydrochloric acid salt as recited in claim 8.

10. A process for producing a compound represented by formula (VII):

[F8]

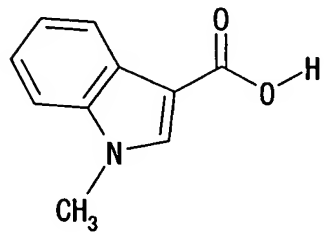


(VII)

(wherein R^{2b} represents a linear or branched lower alkyl

group which may be substituted, an aralkyl group which may be substituted, or a phenyl group), characterized by comprising reacting a compound represented by formula (V):

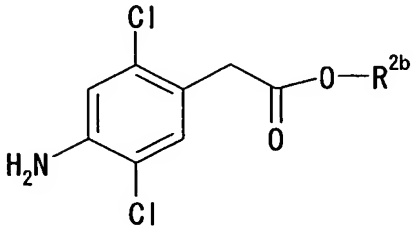
[F6]



(V)

with a chlorinating agent and a compound represented by formula (VI):

[F7]

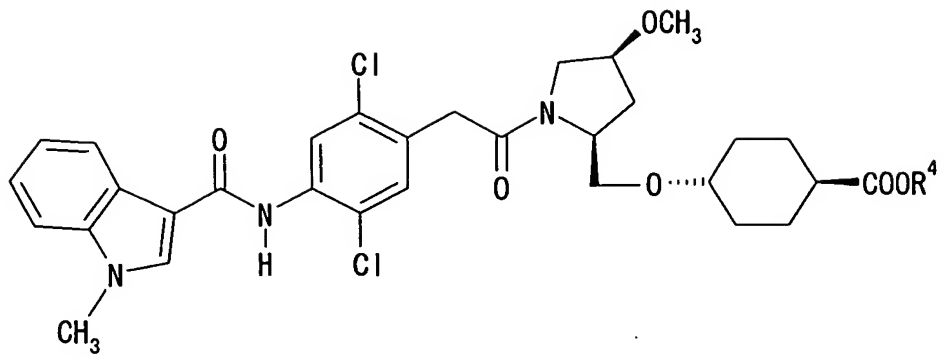


(VI)

(wherein R^{2b} has the same meaning as defined above) or a salt thereof under acidic conditions without addition of a base.

11. A process for producing a compound represented by formula (IX):

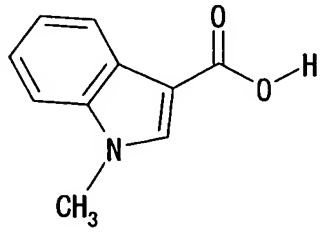
[F11]



(IX)

(wherein R^4 represents a linear or branched lower alkyl group which may be substituted, or an aralkyl group which may be substituted), characterized by comprising reacting a compound represented by formula (V):

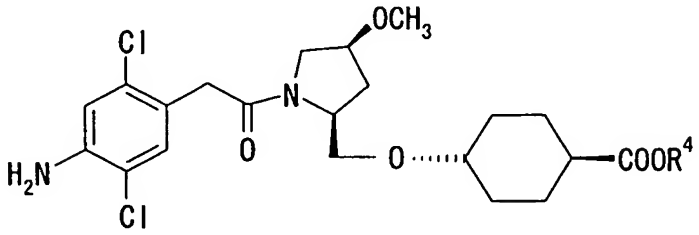
[F9]



(V)

with a chlorinating agent and a compound represented by formula (VIII):

[F10]

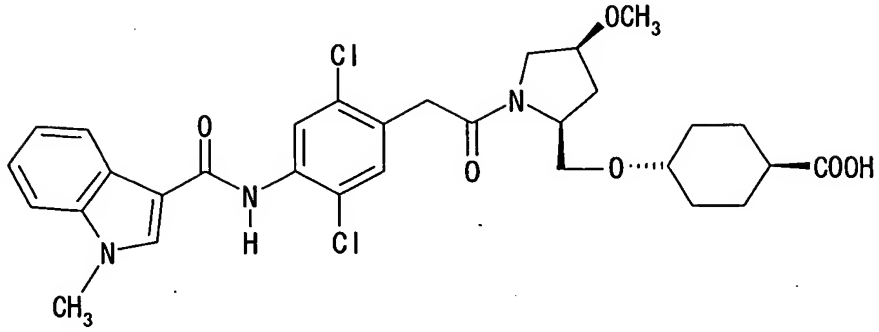


(VIII)

(wherein R^4 has the same meaning as defined above) or a salt thereof under acidic conditions without addition of a base.

12. A process for producing a compound represented by formula (XII):

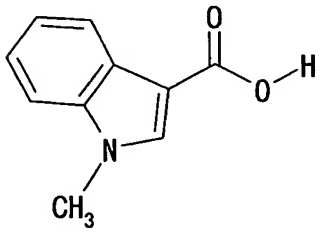
[F16]



(XII)

or a salt thereof, or a hydrate of the compound or the salt, characterized by comprising reacting a compound represented by formula (V):

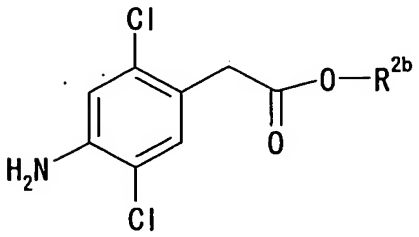
[F12]



(V)

with a chlorinating agent and a compound represented by formula (VI):

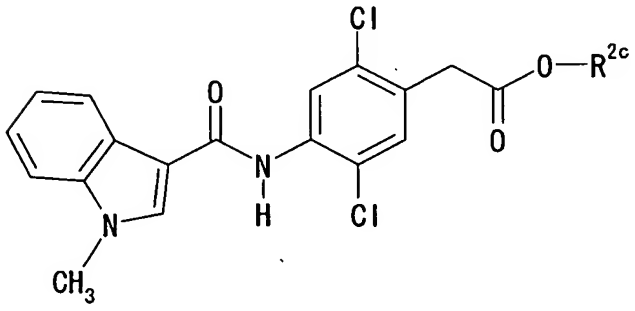
[F13]



(VI)

(wherein R^{2b} represents a linear or branched lower alkyl group which may be substituted, or an aralkyl group which may be substituted, or a phenyl group) or a salt thereof under acidic conditions without addition of a base; optionally hydrolyzing the product to thereby yield a compound represented by formula (X):

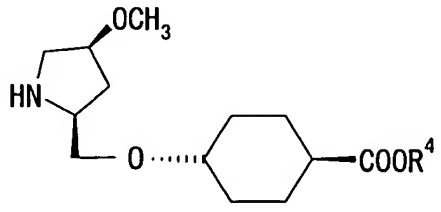
[F14]



(X)

(wherein R^{2c} represents a hydrogen atom, a linear or branched lower alkyl group which may be substituted, an aralkyl group which may be substituted, or a phenyl group); reacting the compound represented by formula (X) with a compound represented by formula (XI):

[F15]



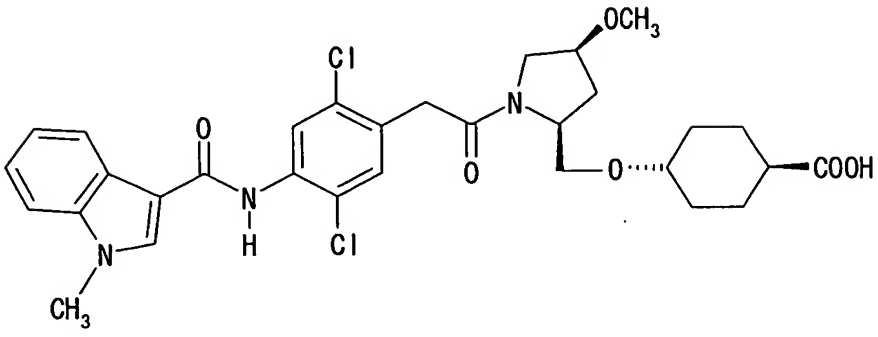
(XI)

(wherein R^4 represents a linear or branched lower alkyl group which may be substituted, or an aralkyl group which may be

substituted); and hydrolyzing the product.

13. A process for producing a compound represented by formula (XII):

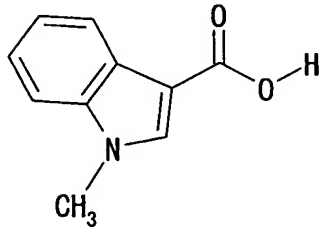
[F19]



(XII)

or a salt thereof, or a hydrate of the compound or the salt, characterized by comprising reacting a compound represented by formula (V):

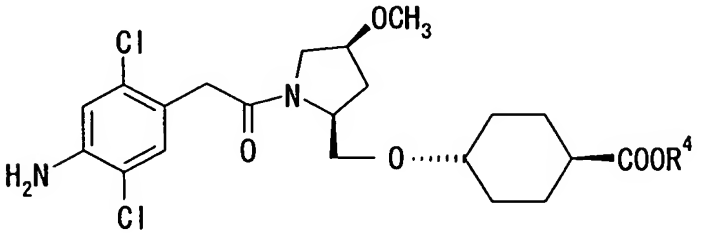
[F17]



(V)

with a chlorinating agent and a compound represented by formula (VIII):

[F18]

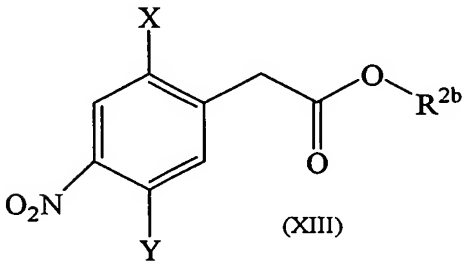


(VIII)

(wherein R^4 represents a linear or branched lower alkyl group which may be substituted, or an aralkyl group which may be substituted) or a salt thereof under acidic conditions without addition of a base; and hydrolyzing the product.

14. A process for producing a compound represented by formula (XIII):

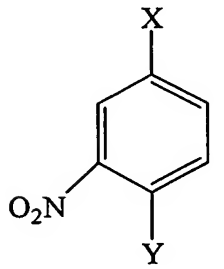
[F22]



(XIII)

(wherein X represents a hydrogen atom or a halogen atom; Y represents a halogen atom or a lower alkoxy group; and R^{2b} represents a linear or branched lower alkyl group which may be substituted, or an aralkyl group which may be substituted, or a phenyl group), characterized by comprising reacting a compound represented by formula (XIV):

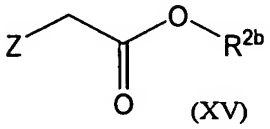
[F20]



(XIV)

(wherein X and Y have the same meanings as defined above) with a compound represented by formula (XV):

[F21]



(XV)

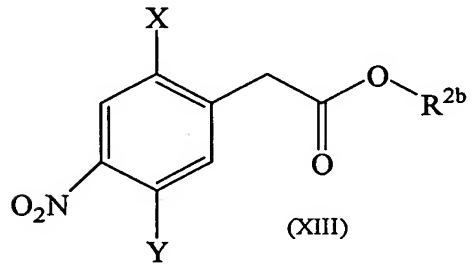
(wherein Z represents a halogen atom, a phenylthio group, an alkoxy group, or an amino group; and R^{2b} has the same meaning as defined above) in a solvent in the presence of a base.

15. The process according to claim 14, wherein each of X and Y in formulas (XIII) and (XIV) represents a chlorine atom.

16. The process according to claim 15, wherein R^{2b} in formulas (XIII) and (XV) represents a tert-butyl group.

17. A compound represented by formula (XIII):

[F23]



(XIII)

(wherein X represents a hydrogen atom or a halogen atom; Y represents a halogen atom or a lower alkoxy group; and R^{2b} represents a linear or branched lower alkyl group which may be substituted, an aralkyl group which may be substituted, or

a phenyl group), a salt thereof, or a solvate of the compound or the salt.

18. The compound according to claim 17, a salt thereof, or a solvate of the compound or the salt, wherein each of X and Y in formula (XIII) represents a chlorine atom.

19. The compound according to claim 18, a salt thereof, or a solvate of the compound or the salt, wherein R^{2b} in formula (XIII) represents a tert-butyl group.

20. The process according to any one of claims 1 to 7, wherein the compound represented by formula (II) is a compound produced through reduction of the nitro group of the compound represented by formula (XIII) produced through the process according to claim 14, a salt thereof, or the solvate of the compound or the salt.

21. The process according to claim 10 or 12, wherein the compound represented by formula (VI) is a compound produced through reduction of the nitro group of the compound represented by formula (XIII) produced through the process according to claim 15 or 16, a salt thereof, or the solvate of the compound or the salt.